Mohit PRASHANT

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I am a PhD candidate researching theoretical machine learning and probabilistic guarantees for reinforcement learning safety. I have a strong background in stochastic optimization as well as risk determination. In my free time, I like playing strategy-based games and working on my programming skills.

EDUCATION

Nanyang Technological University (NTU), Singapore

PhD., Computer Science **Jan 2022 – Dec 2025**

(Thesis) Probably Approximately Correct Guarantees Within Reinforcement Learning

B. Eng., Computer Science (Honours, Distinction) **Aug 2018 – Dec 2021**

Specializations in Data Science and Artificial Intelligence

SELECTED PUBLICATIONS

Probabilistic Guarantees on Machine Learning Safety and Risk

(Conference Paper) Prashant, Easwaran, Das and Yuhas, "*Guaranteeing Out-Of-Distribution Detection in Deep RL via Transition Estimation*", Annual AAAI Conference on Artificial Intelligence 2025 **(AAAI)**

(Conference Paper) Prashant and Easwaran, "*PAC-Based Formal Verification for Out-of-Distribution Data Detection*", IEEE International Conference on System Reliability and Safety 2022 **(ICSRS)**

(Poster) Prashant, Rahiminasab and Easwaran, "*Assured Autonomy in Cyber-Physical Systems*", Technovation Showcase 2021

Theoretical Machine Learning

(In Review) Prashant, Easwaran and Varakantham, "*Probably Approximately Correct Guarantees for Reinforcement Learning in Continuous State-Spaces Through Discretization*", IEEE Transactions on Artificial Intelligence **(TAI)**

(In Review) Prashant and Easwaran, "*Improving Reinforcement Learning Sample-Efficiency with Local Approximation*", International Joint Conference on Artificial Intelligence 2025 **(IJCAI)**

Generative Modelling

(In Review) Prashant and Easwaran, "*Guaranteeing Robust Deep Reinforcement Learning with Barrier-Certificate Aided Scenario Generation*", Reinforcement Learning Conference 2025 **(RLC)**

(Conference Paper) Prashant, "*Adversarial Input Masking with Generative Models*", The Student Conference on Artificial Intelligence 2021 **(STCAI)**

WORK EXPERIENCE

Nanyang Technological University (NTU), Singapore

Machine Learning Researcher **Aug 2019 – Dec 2025**

- Began research on theoretical machine learning and probabilistic guarantees as a part-time assistant during undergraduate years and continued work as a PhD candidate after graduating.
- Presented a guest lecture on efficiently scaling near-optimal learning for Markov Decision Processes at SEAS, University of Pennsylvania.

Teaching Assistant, Operating Systems **Aug 2022 – Dec 2025**

- Designed and taught the curriculum for the course practical using Xv6 to teach students multithreading, scheduling, memory management and system calls in Linux environments.

Teaching Assistant, Data Structures and Algorithms **Aug 2023 – May 2024**

- Taught DSA concepts in tutorial and laboratory classes.

Munich Reinsurance, Global Consulting Unit

(Intern) **Data Scientist** **May 2021 – Oct 2021**

- Conducted rule association mining on large datasets to extract insights for financial fraud detection. (R, Python)
- Cleaned datasets for potential machine learning applications aiding clients within the non-life sector. (Python)
- Extracted information from geospatial data to inform pricing models and risk for policy engineering. (Python)

Singapore Technologies Land Engineering Systems

(Intern) **Data Scientist/Software Engineer** **Aug 2020 – Dec 2020**

- Experimented on image-processing and ML models to design efficient object-detection modules for AVs. (Python)
- Collaborated with the simulation team to design and program UI-based software to boost productivity. (Qt5)
- Developed thread-based utility libraries to increase execution speed of simulation software by 43%. (C++)

Quid Lab

Assistant Server Administrator **Jun 2019 – Aug 2029**

- Efficiently migrated clients' websites and web-based software with zero downtime.
- Set up web servers on Microsoft's Azure service using Debian 9 and MySQL. (Linux, SQL)

AWARDS AND ACHIEVEMENTS

Nanyang Research Scholarship **Jan 2022**
- Obtained and maintained the scholarship subject to stellar academic performance and research work.

Undergraduate Research Excellence Award **Aug 2020**
- Co-developed a technique to evaluate probabilistic safety in ML while working in a research team for a year.
- Authored a submission based on the findings of the project as part of the URECA program.

Delightex Explorer Award **Mar 2020**
- Developed a robotic system for additive manufacture of food.

(Runner Up) **AI For Humanity** **Mar 2019**
- Co-authored a submission on the ethics of discriminatory profiling by AI and a framework for potential solutions.
- Delivered a well-received presentation to experts in AI, policy and ethics on identifying and deterring profiling.

SELECTED PROJECTS

Efficient Hierarchical Reinforcement Learning for Strategy Gaming **Apr 2022 – Feb 2025**
- Trained an RL agent to efficiently solve various game environments (BloonsTD3, Terminal, MineCraft…) by modifying the proximal policy optimization framework using stabilization methods from theoretical RL research. (PyTorch)

Sentiment-Based Investing with Recurrent Neural Networks **May 2023 – Jan 2024**
- Developed software to browse social media and news sites in real-time to inform investing decisions. (C++)
- Built a model using decision trees and BERT-based classifiers to gauge sentiment of various handpicked stock and cryptocurrencies to run an automated trading strategy factoring information quality and risk. (Python).

T(h)readSafe **Oct 2020 – Dec 2022**
- Engineered a library to safely and efficiently instantiate/terminate threads for running simulation programs on to minimize memory leakages. (C++)

Computing Value at Risk with Monte-Carlo Simulations **Mar 2022 – May 2022**
- Computed VaR for a semiconductors-based portfolio with long-short hedging using Monte-Carlo simulations to determine the best strategy for limiting risk caused by market exposure. (Python)
- Optimized the portfolio using a stochastic GridSearch technique to approximate the position with minimum risk.

TwitterCrawler **Jan 2021 – Feb 2022**
- Built a wrapper over the default Twitter API in order to efficiently gather data for sentiment analysis. (Java)
- TwitterCrawler is now an opensource project with multiple forks and contributions by the Github community. (Git)

Multiple Linear Regression for Stock Pricing Analysis **Nov 2021 – Dec 2021**
- Conducted a regression analysis of semiconductor stock prices against numerous factors (e.g. other stock prices, cryptocurrency indices, commodities) to uncover trading signals. (SciKitLearn)

SAXML **Sept 2020 – Jun 2021**
- Designed and developed a lightweight sequential access XML parser to efficiently extract and utilize data. (C++)
- SAXML has evolved into an opensource project that has been contributed to by the GitHub community. (Git)

CO-CURRICULAR ACTIVITIES

Strategy and Gaming **Sep 2020 – Current**
- Currently running a three year long DnD 5e campaign as the dungeon master.
- Organized the interest group in algorithmic trading strategies and programmatic real-time strategy games.

Competitive Programming **Jan 2018 – Current**
- Placed within the top 100 within Google Hashcode 2022.
- Top 10% on current LeetCode rankings.

Red Cross Singapore
Volunteer **Aug 2019 – Dec 2024**
Fundraising Officer, Youth Group **Aug 2018 – Aug 2019**
- Led a committee of individuals highly dedicated to volunteering and community service.
- Planned and initiated a series of five events raising funds totalling $12000 for disaster relief and community aid.

Judo Club NTU **Aug 2019 – May 2022**

SKILLS

Tools	Languages	Additional Information
Anaconda, Android Studio, Eclipse, Linux, MATLab, MySQL, NetBeans, PyTorch, Qt, SciKitLearn, Statsmodels, TensorFlow, Unity	C/C++, HTML/CSS, Java, JavaScript, Python, SQL	• Strong mathematical background. • Moderate app. development experience.